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THE EFFECTS OF PALM TOCOTRIENOL RICH FRACTION (TRF) ON PROATHEROSCLEROTIC CHANGES IN AORTA OF RATS FED HIGH METHIONINE DIET.

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INTRODUCTION:

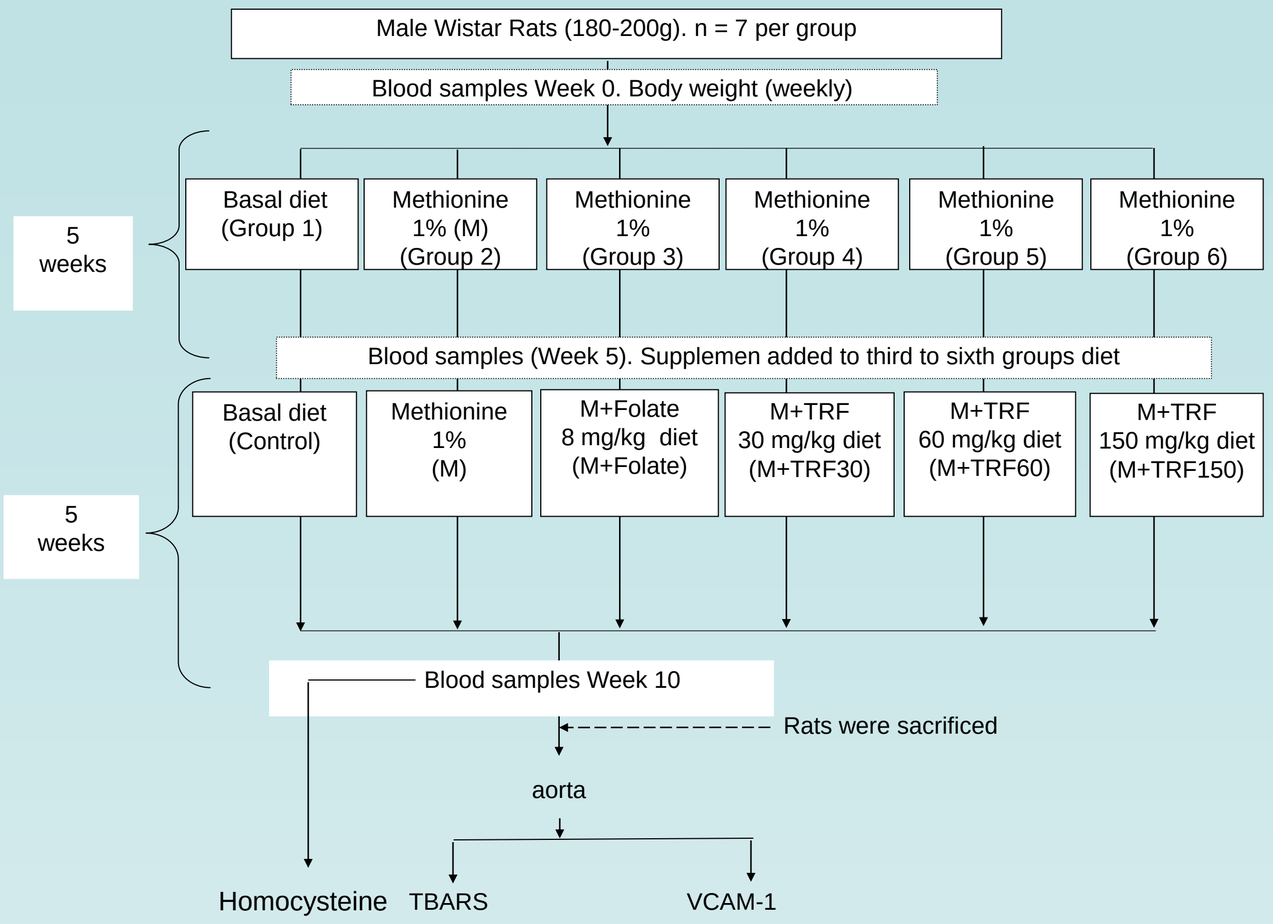
Hyperhomocysteinemia is a risk factor for cardiovascular diseases. It is associated with an increase in oxidative stress. We aimed to study the effects of palm tocotrienol rich fraction (palm TRF) on proatherosclerotic changes in aorta of rats fed high methionine diet.

Methodology:

42 male Wistar rats were divided into six groups. The first group was the control. Group 2 to 6 were fed 1% methionine diet for 10 weeks. From week 6 onward, folate (8 mg/kg diet) or palm TRF (30, 60 or 150 mg/kg diet) were added into the diet of group 3 (M+Folate), 4 (M+TRF30), 5 (M+TRF60) and 6 (M+TRF150) respectively. Body weights were recorded weekly.

Statistical analysis:

Statistical Package for Social Sciences (SPSS) 11.5 was used. Data is presented as Mean ± SEM. $P < 0.05$ is considered significant.



RESULTS:

No significant difference in body weight was recorded. Methionine diet (M) significantly raised the total plasma homocysteine (tHcy) level and this was reduced by the supplementations of palm TRF at 150 mg/kg diet and folate. The dietary methionine increased aortic lipid peroxidation as shown by the increase in TBARS (604.0 ± 51.0 pmol MDA/mg protein, $P < 0.05$). Supplementations of folate and TRF at all doses respectively reduced the oxidative stress (300.0 ± 96.0, 334.0 ± 75.0, 338.0 ± 72.0 and 222.0 ± 41.0 pmol/mg protein). High methionine diet also increased expression of VCAM-1 but it was reversed by folate and palm TRF at 150 mg/kg diet.

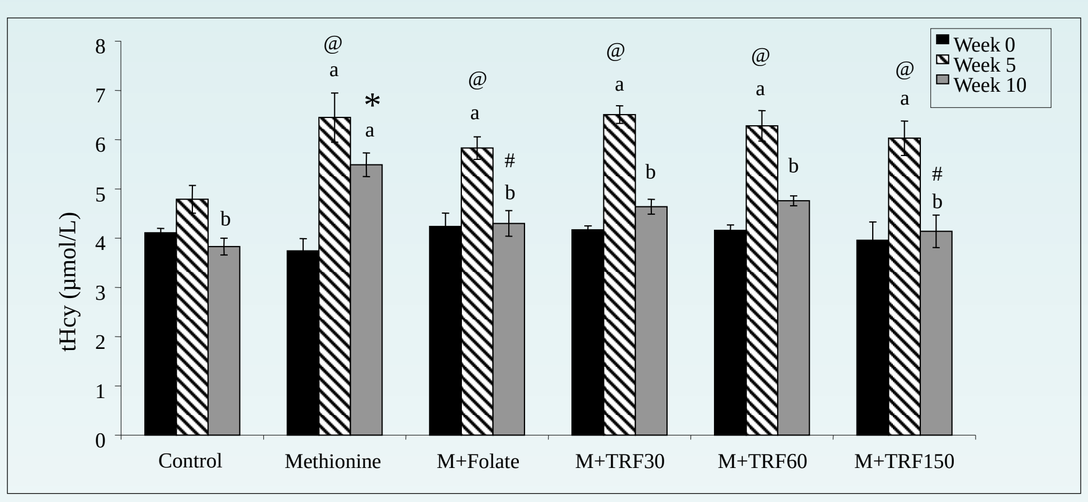


Figure 1: Total plasma homocysteine level (tHcy) (µmol/L) in rats at weeks 0, 5 and 10 fed either basal diet (control), 1% methionine diet (M) (week 0-10), 1% methionine diet + folate (8 mg/kg diet) or palm palm tocotrienol rich fraction (TRF) (30, 60 or 150 mg/kg diet) for 5 weeks (week 6-10). The result is expressed as mean ± SEM (n = 7).

@P < 0.05 vs. Control (week 5),
* P < 0.05 vs. Control (week 10),
#P < 0.05 vs. Methionine (week 10),
a P < 0.05 vs. week 10 of the same group,
b P < 0.05 vs. Week 5 of the same group.

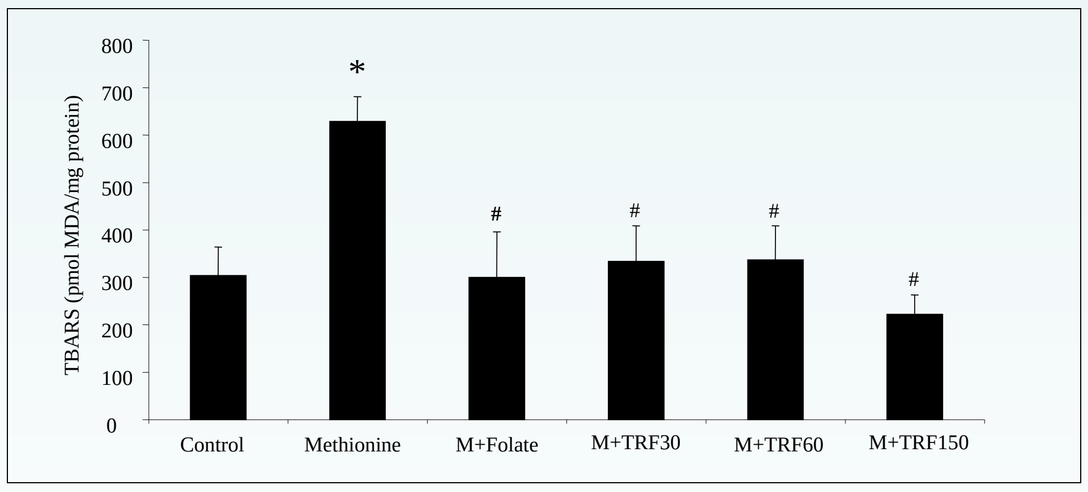


Figure 2: The thiobarbituric acid reactive substance (TBARS) level (pmol/mg protein) in aorta of rat fed either basal diet (control), 1% methionine diet (M) (week 0-10), 1% methionine diet + folate (8 mg/kg diet) or palm tocotrienol rich fraction (TRF) (30, 60 or 150 mg/kg diet) for 5 weeks (week 6-10). The result is expressed as means ± SEM (n = 7).

* P < 0.05 vs control
# P < 0.05 vs methionine group.

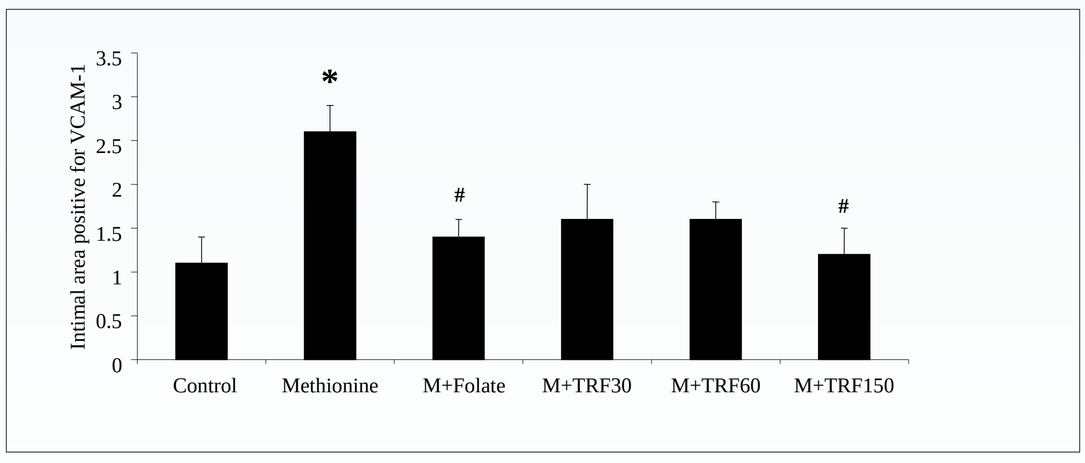


Figure 3: The area of intima (aorta) positively expressing vascular cell adhesion molecule 1 (VCAM-1) in rats fed either basal diet (control), 1% methionine diet (M) (week 0-10), 1% methionine diet + folate (8 mg/kg diet) or palm tocotrienol rich fraction (TRF) (30, 60 or 150 mg/kg diet) for 5 weeks (week 6-10). The result is expressed as means ± SEM (n = 7).

* P < 0.05 vs control
# P < 0.05 vs methionine group.

CONCLUSIONS:

Palm TRF at 150 mg/kg diet and folate reduced oxidative stress and expression of VCAM-1 in the rat aorta probably via reduction of raised plasma homocysteine level induced by high methionine diet in male Wistar rats.

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